UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/735,009	12/12/2000	Charles E. Boardman	24-BR-6010	3389

7590 08/14/2002

John S. Beulick
Armstrong Teasdale LLP
Suite 2600
One Metropolitan Square
St. Louis, MO 63102-2740

EXAMINER	
PALABRICA, RICARDO J	
ART UNIT	PAPER NUMBER
3641	

DATE MAILED: 08/14/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/735,009	BOARDMAN ET AL.	
	Examiner	Art Unit	
	Rick Palabrica	3641	

-- Th MAILING DATE of this communication appears on th cov r sheet with the correspond nce address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 June 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) *12-24,34 and 35* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11 and 25-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Applicant's amendment in Paper No. 7 correcting the specification in response to Examiner's comments and amending claims 1 and 25, are acknowledged.

2. Applicant traversed the rejection of claims based on Koutz on the grounds that his claimed invention does not include a closed loop heating circuit that utilizes a working fluid. In response to this argument, it is noted the features upon which applicant relies (i.e., "open loop heating circuit") is not recited in rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Applicant's other arguments on the claim rejections have been fully considered but they are not persuasive.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-11 and 25-33 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as

to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In Paper No. 7, the applicant amended independent claims 1 and 25, in response to Office Action of March 19, 2002. The current claim 9 introduces the new subject matter of "feedwater input line coupled to said steam generator, said topping heater, and said high temperature water cracking system." Neither the specification nor the drawings at the time the application was filed disclose this new structure configuration of a feedwater line being coupled to all three components, i.e., 1) steam generator; 2) topping heater; and 3) high temperature water cracking system. For example, note in Fig. 1 that the feed water line 32 from the desalination plant couples only to steam generator 16. This figure does not show any feed water line connection to either the topping heat 20 or to the high temperature water cracking system 18.

4. Claims1-11 and 25-33 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. There is neither an adequate description nor enabling disclosure of the new structural configuration of a "feedwater input line coupled to said steam generator, said topping heater, and said high temperature water cracking system." See section 3 above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-11 and 25-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,576,783 to Koutz in view of either one of Interrante et al. (U.S. 3,821,358) or Wentorf, Jr. (U.S. 3,842,164). Koutz discloses the applicant's claims except for the use of a liquid metal reactor and a gas heater to raise the temperature of the feedwater heated by a liquid metal reactor, or the inclusion of a desalination plant in the system.

Koutz discloses the same inventive concept as the applicant of augmenting the temperature of a working fluid heated by a nuclear reactor to provide a temperature necessary to carry out thermal decomposition of water to produce hydrogen (see column 1, 2nd paragraph and column 2, lines 30+). Koutz discloses a high temperature gas cooled reactor with a reactor core (12) that heats the radioactive, primary coolant to approximately 1350°F. There is a non-radioactive, secondary loop (22) that contains a working fluid (such as steam) flowing through an intermediate heat exchanger (20) that raises the temperature of said fluid to approximately 1200°F. A heat pump (28) further

raises the temperature of said working fluid to 1500°F prior to flowing through a process chamber (30) where said fluid supplies the heat to produce hydrogen by thermal chemical water splitting. Note that the temperature of Koutz's working fluid is consistent with applicant's stated temperature of at least 850°C (1562°F). Koutz also discloses a steam turbine that drives an electric generator (see column 3, lines 27-30). Koutz further teaches the use of at least three regenerative heat exchangers in his system (see, for example, column 2, lines 55-59; column 3, lines 20-25).

Applicant's claim language reads on Koutz' invention as follows: "feedwater" reads on the "fluid in the secondary loop 22", "steam generator" reads on "heat exchanger 20", "topping heater" reads on "heat pump 28", and "high temperature cracking system" reads on "process chamber 30."

Either one of Interrante et al. or Wentdorf, Jr. teach the use of either a high temperature gas reactor or a liquid metal reactor as a heat source for thermochemical production of hydrogen and oxygen (e.g. see column 2, lines 28+ in Interrante et al. or column 2 lines 45+ in Wentdorf, Jr.).

One having ordinary skill in the art would have recognized that the heat exchanger 20 in the secondary side of Koutz's system works on the basis of heat being supplied by an appropriate heat source in the primary side, and substituting a liquid metal reactor as primary heat source for the gas-cooled of Koutz would have been prima facie obvious.

As to the limitations regarding the gas-fired heaters, regenerative heat exchangers and gas desalination plant, which the examiner stated on page 5 of his

3/19/02 Office Action as well known in the art, said statement was not seasonably traversed by the applicant. Therefore, these objects of the well-known statement are taken to be admitted prior art. See MPEP 2144.03.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system, as disclosed by Koutz, by the teaching of either one of Interrante et al. or Wentdorf, Jr., and admitted prior art, in order to have a system for generating hydrogen comprising feedwater, liquid metal reactor, steam generator, high temperature water cracking system, and gas topping heater, as this is no more that the use of well known techniques/design in the nuclear art, and the substitution of one system component by another well known system component.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. References D-G, U and V further illustrate prior art.

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rick Palabrica whose telephone number is 703-306-5756. The examiner can normally be reached on 8:00-4:30, Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Carone can be reached on 703-306-4198. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-0285 for regular communications and 703-305-0285 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.

RJP
August 8, 2002.

SUPERVISORY PATENT EXAMINER